

USER GUIDE

VIDEOKEYTM

RGB Converter
for the Atari ST

ANOTHER FINE PRODUCT

FROM



"You unlock this door with the key of imagination..."

-Rod Serling

Preface

The Atari ST series, including the Mega ST, is a powerful line of computers. With a 68000 microprocessor and up to four megabytes of memory, along with its brilliant color display, there is a great amount of potential for graphics and animations with the right software.

Software is now available to exploit that power. With Antic's Cyber Studio line of products, as well as other graphics programs, you can create full length "movies" for commercial applications or just for fun! But to do quality animations you need at least one meg of memory, which means your best Atari system choice is either the popular 1040 or new Mega machines. Since these machines don't presently provide composite video or RF output you are faced with a dilemma - how can you record your graphics creations for practical use? Is your art forever "locked up" inside your machine?

Many people with monochrome monitors would also like to play games without having to purchase a dedicated RGB monitor. Perhaps you have a composite monitor you would like to put to use. Or maybe you think it would be great to play games on your big screen TV. Can these options ever work for you?

Enter VideoKey...

With VideoKey, now you can easily record your graphics creations or simply hook up a composite monitor or television. Basically, VideoKey takes the Atari's RGB signals and converts them to color composite. It was designed to provide the highest quality color composite video and RF output possible for all Atari ST computers. Color representation is great - the reds really are red and the blues are blue!

Along with composite video and RF, VideoKey offers separate audio output for use with your stereo or amplified speaker. It also provides a 13-pin DIN (just like your monitor port) so you can still use your RGB or monochrome monitor.

VideoKey has some other nice features. It automatically powers up when your computer is turned on and in color mode - no power switch is required! It boasts the exclusive Colorloc™ circuitry that prevents color crawl (colors "fluttering" or "floating") on sharp, vertical edges. All these features are contained in one external hardware unit, requiring no modifications to your machine. It has a custom molded 2.5 foot cable and a professional, injection molded case (approx. 4 x 5.25 x 1.5 inches) designed to compliment the ST.

Note: VideoKey was optimized for use in low resolution since nearly all graphic and animation software is for low resolution color and most games are also for low resolution. Since low resolution takes advantage of the additional colors available, it seems a logical choice. Medium resolution is usable in some instances although text is not normally readable, partly due to the inherent qualities of composite video but mostly because of the ST's non-standard sync rates. (This is also discussed further in this manual.) If you do have the occasional need to operate the ST in medium resolution, turning down the color control on the monitor or television will increase readability.

VideoKey is compatible with all low resolution graphics and games software.

Package Contents

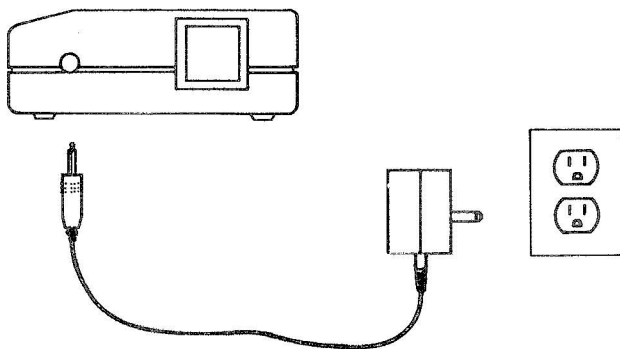
This package should contain one VideoKey, one AC/DC adapter plus your warranty card and information as well as this manual.

Installing Your VideoKey

We suggest you familiarize yourself with this entire manual before attempting to hook up your VideoKey.

To install VideoKey, first turn off your computer. Unplug your monitor from the ST's monitor port and plug in the cable provided on VideoKey. Plug the AC/DC power adapter's miniplug into the jack marked "power" on VideoKey. Plug into a standard wall outlet using 115-120 volts 60 cycle AC current after all other connections are made. (See figure 1)

figure 1



If you have an Atari RGB or monochrome monitor then plug it into the port labeled "monitor" on VideoKey (see figure 2). Your RGB monitor can be used at the same time as your VCR, composite monitor or other video device. Note, however, when using a monochrome monitor that the ST will detect the monitor is connected and turn the VideoKey off. The monochrome monitor must be unplugged for VideoKey to power on.

If you have both a monochrome and RGB monitor then Monitor Master, our monitor switchbox, can be plugged in VideoKey's "monitor" port. Switching between the monitors using the push-button will automatically enable VideoKey when in color mode.

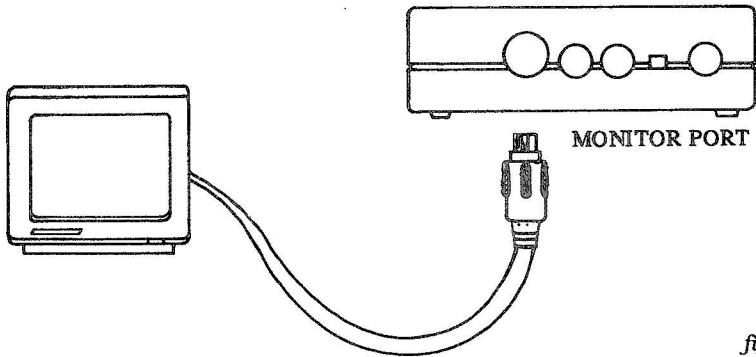


figure 2

Connecting a VCR or Composite Monitor

For best video results, plug in a quality shielded video cable (75 ohm) to the RCA jack labeled "video" on VideoKey (see figure 3). The other end connects to the video input of your VCR deck, composite monitor or other video device requiring a standard NTSC signal.

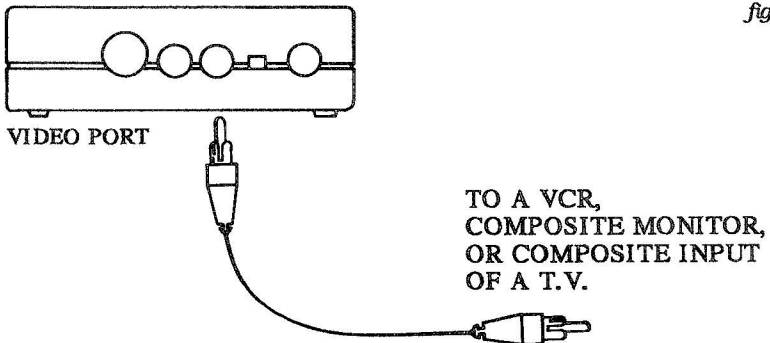
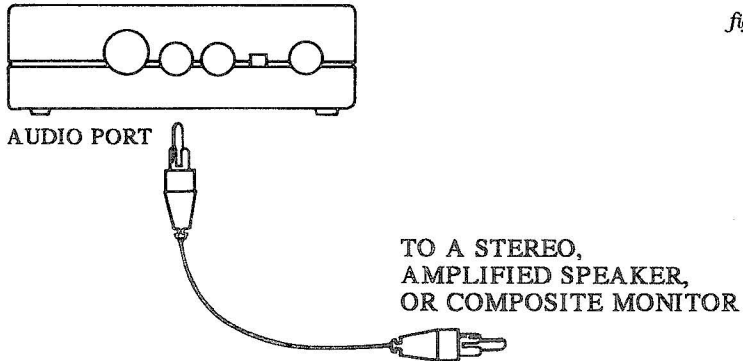


figure 3

VideoKey also provides an RCA jack labeled “audio” outputting a standard 1 volt level, suitable for recording or feeding into the auxillary input of an external amplifier. Simply plug in a standard audio cable and connect to the audio input of your device (see figure 4).



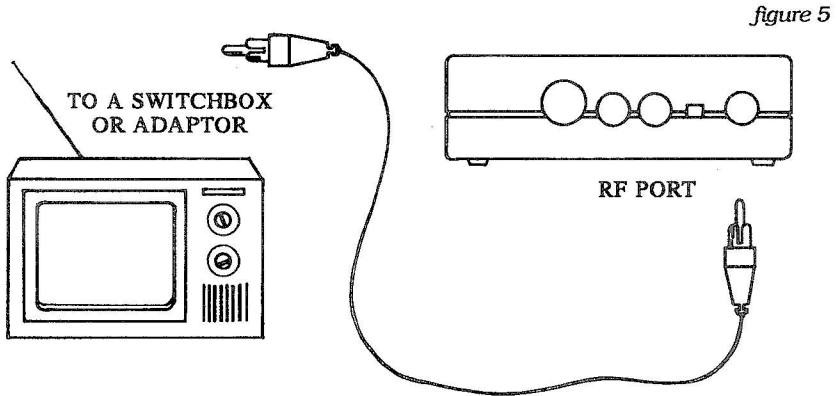
Note: VideoKey is designed to give a standard NTSC video signal with an RGB monitor installed in its “monitor” port. This is for easy recording of your graphics without having to unplug your RGB monitor (different loads will affect the output level of VideoKey). If you are not using an RGB monitor, in some cases you may notice the color will oversaturate and bleed while recording and a special termination plug may be necessary. Contact Practical Solutions for further details.

Connecting a Television

VideoKey works very well in low resolution on a color television set. Set your VideoKey to channel 2 or 3, depending on which TV channel is unused in your area and plug in a shielded RF cable to VideoKey’s jack labeled “TV” (see figure 5). If you are connecting to a television with an antenna then a computer/antenna switchbox must be used to comply with FCC regulations. Set your television channel to the same as VideoKey, fine tuning your TV tuner for a good picture if necessary. (For assistance in fine tuning your

TV, refer to your television's Owners Guide.)

You may also use VideoKey's composite video output if your television uses video input, in which case hookup is the same as a composite monitor.



Colorloc™ Adjustment

The exclusive Colorloc™ is an adjustment that may be necessary when first installing your VideoKey. It synchronizes the unit to your ST to keep the colors from "fluttering" on the screen.

Turn on your computer as you normally would. VideoKey will power up automatically and you should see the familiar desktop display. Locate the small trimmer adjustment located on the bottom of VideoKey. With a small screwdriver (a jeweler's screwdriver works well) turn the trimmer no more than once around in either direction until the power LED light glows at its brightest point. There may be two points where this happens, in which case either adjustment point is ok. A slight flicker in the LED is normal.

When the Colorloc is adjusted correctly there should be no "color crawl" visible on the screen. To check this, look carefully at your desktop (at a disk icon, for example) and see if you can spot any color movement. If not, then you have it adjusted right! This is a one-time adjustment and our Colorloc circuitry is now perfectly matched to your ST. Further adjustment should not be necessary.

Videotaping With VideoKey

As you may know, composite video can never match an RGB screen. It, along with the 1/2 inch videotape format (standard VCR), does have its limitations. With careful attention to detail when creating your graphics and animations, however, more than satisfactory results can be achieved.

Some colors are more stable than others. Shades of gray are very stable and greens are very good as well. Use blues and reds with care as they tend to bleed when saturated. Reds are especially notorious in any video work. Try not to put opposite colors side by side on the same screen - they tend to bleed into each other. The background color that you choose can also make a big difference in how your artwork looks on video.

In addition, remember that you are working with essentially a digital signal that is converted to analog. This enables you to create a signal that cannot be created by a camera and it is confusing to a monitor or a VCR. Be careful of sharp, vertical edges and extreme amount of contrast in the vertical plane. These can cause edge aberrations as well as artifacting.

A lot can be learned by trial and error. Don't be afraid to experiment! Study the special effects of any graphics or animations you may have available. You may also want to read a book on video broadcast and production to pick up additional hints. You'll soon find what techniques you can use to maximize your final product using VideoKey.

Signals, Signals

RGB is a type of video designed to allow higher resolution displays for computers. The red, green and blue color signals, as well as the sync signals travel on separate wires and eliminate the interference that normally occurs with single line video. With individual color signals provided by the computer, the RGB monitor does not have to "decode" or translate the video into the respective red, green and blue signals and the result is a clearly superior picture. The main drawback to RGB is its incompatibility with most other video systems.

Color composite video, as defined by the NTSC standard, is comprised of all the necessary color, brightness and synchronization signals all squeezed into one signal. A composite monitor receives this one signal and has to translate it into red, green and blue. The picture quality is not as high as RGB since there is some interference from its imperfect separation process. Its compatibility with television, however, makes color composite more convenient than RGB.

RF is the type of signal that provides standard television output. The color composite video signal is combined with the audio and another signal (a carrier) to form RF television frequencies. This allows composite video to be shown on an ordinary television, although the picture quality is not as high as with a composite monitor since two other signals have been added. The TV tuner then has the difficult task of separating the composite video and audio from the carrier, causing still more signal degradation.

Technical Jargon

With VideoKey, the RGB signals are fed into a color difference and luminance matrix that generates color difference signals (R-Y and B-Y) and the luminance signal (-Y). The R-Y and B-Y signals drive circuitry that generates the chroma information in sync with the color burst that we provide. Color burst is a reference that is used along with the chrominance information to tell the system exactly what color should be shown and where. The chroma signal also contains the color saturation information. This determines how vivid the colors appear on the screen. The luminance signal is used for the amplitude, or brightness, of the signal. All of this information is extracted from the RGB and sync signals provided by the computer and is combined together to make an NTSC composite video signal. This signal is brought out to the video jack as well as an RF modulator circuit that provides the TV output. As you can see, it is quite a complicated process!

While we have strived to make the VideoKey produce the best signal possible, we must advise that when converting RGB to composite video, some signal degradation does occur. System bandwidth has to be limited to minimize artifacts (a barber poling effect) and some problems do occur from the coding and decoding process. Further complicating matters is the fact that the Atari ST computers use a 32.0424 mhz clock rate, in order to run

the system at maximum speed. This does vary the sync rates from the NTSC standard. The standard NTSC horizontal sync rate is 15734 hertz, versus the ST's horizontal sync rate of approximately 15769 hertz. This makes it much more difficult to get good color definition with little artifacting¹ on sharp, vertical edges. This also can cause some edge distortion of the image being displayed.

Combining the RGB and sync signals into a 25-year-old format that contains sync, luminance and color information results in an image that cannot be as good as your RGB monitor. After all, when NTSC format was decided on, computer graphics were merely a dream!

Design Considerations...

When designing the VideoKey, we had several choices to make due to the limitations of the ST's video output. If we compromised the design to allow for readable 80-column text, the colors would be muted and dark in low resolution. As stated before, we decided to optimize the circuitry for low resolution. We think that you will be pleased with our decision - the colors are vibrant and 40-column text is perfectly readable. Chroma/Luma artifacts are almost eliminated in low resolution. And as with any product, we had to decide whether to make VideoKey a low cost unit without any extra features and lower quality output, or do the best job we could. If you own any of our other products, it should be obvious which route we took!

We are proud to present VideoKey and hope that its functions serve you well and provide you much enjoyment. We thank you very much for your purchase.

¹Most of the ST's artifacting is caused by the ST's horizontal sync rate not being a correct submultiple of the chroma sync. This causes crosstalk between the chrominance and luminance signals. Its effect is often improper colorings on sharp, vertical edges (such as text). With VideoKey, we have reduced it to acceptable levels in low resolution, although it is apparent in medium resolution. It is reduced by luminance filtering, with the result of less brightness detail. In addition, encoding fast brightness signals (edges) causes a "confusion" in video equipment, since the rise time of the waveform causes harmonics that are in the bandwidth of chroma signals.

Problems?

If you have any problems with your VideoKey installation, please check these items. If, after running through this checklist, you still can't find a solution, write or give us a call. We'll be glad to help in any way we can!

No Picture:

Make sure that the cable from your VideoKey is plugged into your computer's monitor port.

Check the AC/DC adapter connection to the wall outlet and that the miniplug is securely plugged into the VideoKey's power jack.

Is the LED light on and bright?

Verify that all your cables are functioning and are connected properly.

If you're using a TV, make sure the channel selector and VideoKey are on the same channel and it is not a channel used in your area. Check your fine tuning adjustment on the tuner (digital tuners require no adjustment).

Unstable Display:

Is the Colorloc adjust correct? (Also refer to the instructions for further details.)

Make sure the VideoKey is not near your monochrome monitor.

Wrong Colors:

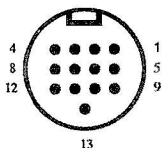
Is an RGB monitor or termination plug installed in VideoKey's "monitor" port?

If using a TV, check the color, tint, brightness and contrast controls.

Technical Specifications

- Standard 1 volt pp color composite signal into 75 ohms
- Bandwidth: approximately 4 mhz
- 1 volt audio: impedance 1K ohms
- RF output: VHF channels 2 and 3, modulate video and audio
- Feedthrough monitor connector provided with all lines necessary for RGB and monochrome monitors
- Power supply: 12 volts DC, 250 millamperes, tip positive

VIDEOKEY MONITOR PORT



- | | |
|-----------------------|-------------------|
| 1 Audio Out | 9 Horizontal Sync |
| 2 Composite Video | 10 Blue |
| 4 Monochrome Detect | 11 Monochrome |
| 6 Green | 12 Vertical Sync |
| 7 Red | 13 Ground |
| 8 Plus 12 Volt Pullup | |

FCC INFORMATION

The Federal Communications Commission Radio Frequency Interference Statement includes the following warnings.

Use high quality shielded cables with this equipment so as not to interfere with radio and television reception.

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, interference with radio and television may occur. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- relocate the receiving antenna
- relocate the computer with respect to the receiver
- plug the computer into a different outlet so that the computer and receiver are on different branch circuits

If necessary, the user should contact the dealer or an experienced radio/television technician for additional suggestions. The user may find helpful the following booklet prepared by the Federal Communications Commission: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. G44-000-00345-4.



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